CLAIM AMENDMENTS

Claim 1. (cancelled)

Claim 2. (currently amended) The system of claim 21 in which the program comprises inputteding parameters, the parameters determininged for the each selected area spot, the parameters comprising the amount of power, the amount of time, and the characteristics of the catalyst material type to be deposited by the plasma source gunupon each spot of the substrate.

Claim 3. (cancelled)

Claim 4. (cancelled)

Claim 5. (cancelled)

Claim 6. (cancelled)

Claim 7. (cancelled)

Claim 8. (currently amended) The system of claim 21 in which the multiple separately defined selected spots of the substrate are arranged in the matrix defined by columns and rows.

Claim 9. (currently amended) The system of claim 8 in which a number $(_N)$ of separately defined spots in the rows and a number of separately defined circular areasspots $(_N)$ in the columns is $rows_N = columns_N$.

Claim 10. (previously presented) The system of claim 9 in which a relationship a number $(_N)$ of separately defined spots in one column to the number of separately defined spots in an adjacent column is: spots in $column_N = N$ and spots in adjacent column $_{N+1} = N+1$.

Claim 11. (previously presented) The system of claim 8 in which a relationship of a number of separately defined spots in one row to the number of separately defined spots in an adjacent row is: spots in $row_N = N$ and spots in adjacent $row_{N-1} = N-1$.

Claim 12. (cancelled)

Claim 13. (previously presented) The system of claim 8 wherein the substrate comprises a side surface of a block positioned within the central location of the chamber, the block having a multiplicity of cylindrical substrate elements extending from the side surface thereof, each cylindrical substrate element individually defining a selected spot, the cylindrical substrate elements maintained in an array of columns and rows formed within the block, in which upper surfaces of the cylindrical substrate elements comprise the discrete spots exposed to the sources.

Claim 14. (previously presented) The system of claim 13 in which the cylindrical substrate elements are inset within the block in the matrix and a plate having a plate matrix of openings concentric with the matrix of elements in the block is applied facing the surface of the block, such that the openings in the plate are aligned with the elements and a cross-section area of an opening in the plate is less than a cross-section area of the surface of the corresponding concentric cylindrical element.

Claim 15. (currently amended) The system of claim 21 in which, the program includes selection of ~~controlling each plasma source includes selecting one or more than one of at least:~~ 1) an ion emitted by each plasma ~~source~~ gun within a cluster; 2) the amount of power and the duration of operation for the ~~source~~gun; and 3) the position of the substrate, such that each selected spot of the substrate is exposed to the plasma ~~source~~ gun at the selected power and at the selected duration.

Claim 16. (currently amended) The system of claim 21 wherein multiple guns are arranged in each of multiple clusters and the catalyst materials are deposited on the sample spots in layers in a programmed number of cycles~~15 in which selecting plasma sources and controlling the amount of power and the duration of operation of the source includes controlling the sources in the same operation such that plasma materials from the sources are co-deposited with respect to each spot on the surface of the substrate~~.

Claim 17. (cancelled)

Claim 18. (currently amended) The system of claim ~~15~~21 wherein values from an actual sample spot created at a set power, time and composition are compared to expected values

and the programmed parameters for power, time and composition for that sample spot are adjusted if the actual spot values vary from the expected values. ~~in which controlling ions includes selecting one or more than one of at least: 1) one plasma source within a cluster; 2) the amount of power and the duration of operation of the source; and 3) the position of the substrate, such that each spot of the substrate is exposed to the selected plasma source at the selected power and at the selected duration~~.

Claim 19. (currently amended) The system of claim 21~~18~~ in which the control system positions the substrate and select~~sing the~~ certain plasma ~~source~~ guns and control~~sling~~ the amount of power and the duration of operation of the ~~source~~ guns ~~includes controlling the sources~~ in essentially the same operation such that different ~~plasma~~ catalyst materials from ~~the sources~~ each gun are co-deposited with respect to ~~each~~ a given sample spot on ~~the surface of~~ the substrate.

Claim 20. (currently amended) The system of claim 21~~18~~ in which the control system positions the substrate and select~~sing the~~ certain plasma ~~source~~ guns and control~~sling~~ the amount of power and the duration of operation of the ~~source~~ guns ~~includes controlling the sources~~ in essentially the same operation such that different catalyst ~~plasma~~ materials from each gun ~~the sources~~ are deposited as layers with respect to each sample spot on ~~the surface of~~ the substrate.

Claim 21. (new) A physical vapor deposition apparatus for depositing combinatorial catalyst materials on sample spots arranged on a substrate comprising:

(a) a deposition chamber that when open, receives the substrate and is sealable after the substrate is loaded upon a moveable central shaft that is vertically positioned at the center of the chamber, the chamber being openable after the substrate is processed so that the substrate with the sample spots can be removed therefrom;

(b) a plurality of plasma sources radially disposed within the chamber, the plasma sources depositing catalyst materials as sample spots on the substrate in a predetermined matrix in accordance with coordinates defined by a program, the plasma sources each comprising a cluster of separately controllable plasma guns, each gun depositing, according to the program, a predetermined catalyst material;

(c) a control system controlling each gun and the movement of the shaft according to the program, the control system providing (i) an amount of power to each gun to regulate a rate of

catalyst material deposition, (ii) an amount of time of deposition for each catalyst material to be deposited at a selected sample spot, and (iii) an z, x and y coordinate position of the shaft, wherein, z defines axial rotation coordinates that align the sample spot with one of the radially disposed plasma sources, x defines vertical coordinates that align the sample spot with the same plasma source, and y defines horizontal coordinates that align the sample spot with the same plasma source, each such alignment occurring when the plasma guns in the plasma source are sequentially focused upon each sample spot as the substrate is positioned, and remains at a fixed position for a pre-set period, to create individual sample spots.

Claim 22. (new) The system of claim 21 in which the control system positions the substrate, selects the guns, and controls the amount of power and the duration of operation of the guns, such that different catalyst materials from the guns are applied to a given sample spot in at least one of a layer or a co-deposition.

Claim 23. (new) The system of claim 22 wherein the catalyst material is a metal and the sample spot comprises multiple layers with a single metal in each layer.

Claim 24. (new) The system of claim 22 having layers wherein the catalyst materials are co-deposited in each layer to form ternary alloys.

Claim 25. (new) The system of claim 22 having layers of alternating co-deposited quaternary alloys.